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Fisheries of the Malagasy Republic, 1974

Office of International Fisheries
WASHINGTON, D.C.
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U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service

FISHERIES OF THE MALAGASY REPUBLIC, 1974

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ABSTRACT

The Malagasy fishing industry in 1974 harvested 63,900 metric tons of fish, shellfish, and other aquatic products. Over 60 percent of the catch came from freshwater artisanal fisheries. Only shrimp and tuna are landed by commercial fishermen. Madagascar exports primarily shrimp and tuna. Declining shrimp catches, the exodus of trained personnel, inflation, and fluctuations in international shrimp and tuna prices were the main problems affecting Malagasy fisheries in 1974.

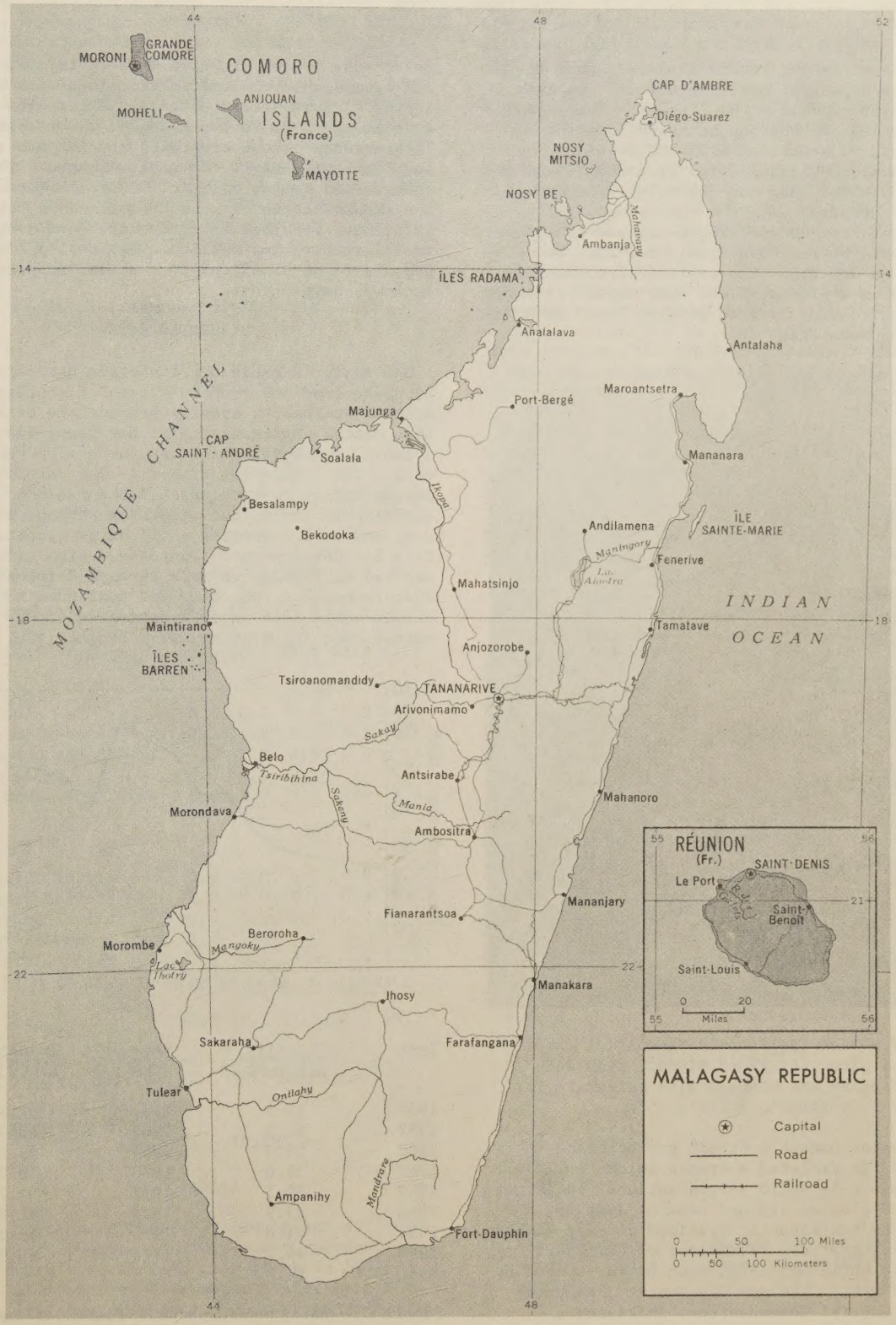


Figure 1.--Malagasy Republic

I. INTRODUCTION

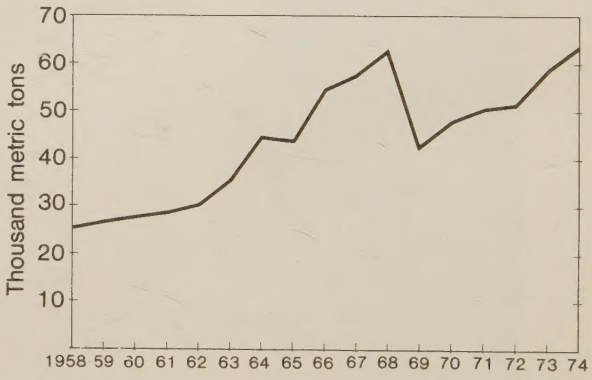
Madagascar is the fourth largest island in the world, encompassing some 226,657 mi^2 (an area only slightly smaller than Texas). The island is 240 miles off the southeastern coast of Africa and is separated from the continent by the Mozambique Channel (fig. 1). Madagascar is about 980 miles long and 360 miles wide at its greatest breadth. It is a land of startling contrasts; from coral-fringed beaches to chilly, wind-swept, barren mountains; from lush tropical forests to deserts. The capital city, Tananarive, is on a plateau 6,000 feet above sea level and is surrounded by rice paddies laced with dikes and dams (fig. 2).

Figure 2.--Rice fields near Tananarive cover valleys along the Ikopa River. Many such rice paddies are stocked with tilapia. (c) National Geographic Society.

Madagascar became a French protectorate in 1885 and was declared a French colony in 1896. The Malagasy Republic gained national independence and adopted its new name on June 26, 1960. The new Republic remained closely linked to France under the Presidency of Philibert Tsiranana until May 1972, when he was ousted by a coup d'etat. The new Government, headed by General Gabriel Roamanantsoa, initiated a policy of "positive neutralism" under which the Malagasy Republic withdrew from the French franc zone, ended its ties with South Africa, and established diplomatic relations with a number of communist countries. A campaign was also launched to revive Madagascar's traditional "fokonolonas" (town councils) and convert them into Tanzanian-style communal villages. These changes and recent political turmoil, including the assassination of a new President in February, 1975, have resulted in political, economic, and administrative instability. The nation now appears to be committed to a socialist path to economic development.

II. FISHERIES CATCH

Madagascar's artisanal fishermen harvest about 80 percent of the country's total fisheries catch. Freshwater species provide the bulk of this catch. Madagascar also has young and dynamic commercial fisheries for shrimp and tuna. The commercial fisheries for coastal shrimp appear to have reached the maximum sustainable yield, but deepwater shrimp, snapper, and tuna fisheries still offer opportunities for development. Increases in the catch started in 1958, as efforts to expand inland fish culture began to pay off, and continued to increase until 1968 when an estimated 63,000 metric tons (t) of fish were caught (fig. 3).



Year	Quantity 1,000 mt	Year	Quantity 1,000 mt
1958	25.5	1967	57.9
1959	27.0	1968	63.0
1960	28.0	1969	43.0
1961	29.0	1970	48.2
1962	30.5	1971	50.7
1963	35.9	1972	51.8
1964	44.8	1973	59.2
1965	44.1	1974	63.9
1966	54.8		

Figure 3.--Malagasy Republic. Fisheries catch, 1974-58. (Source: FAO. Yearbook of Fishery Statistics, various years.)

In 1969, there was a sharp, but unexplained decrease, followed by a recovery. By 1974, the total fisheries catch of the Malagasy Republic was 63,900 t, an all time record. The Malagasy Government does not publish a statistical breakdown of the fisheries catch by species; therefore, a detailed report on individual fisheries is not possible. A breakdown of the major Malagasy fisheries, prepared by FAO, indicates that freshwater species were the most important single fishery by quantity. The other major Malagasy fisheries were tuna, demersal fish species, and shrimp (table 1).

Table 1.--Malagasy Republic. Fisheries catch, 1970-1974

	1974	1973	1972	1971	1970
	--1,000 metric tons--				
FISH					
Freshwater					
Cyprinids	11.6	11.4	11.2	-	-
Cichlids	19.4	19.0	18.8	-	-
Other	7.5	7.6	7.6	36.9	35.1
Total, Freshwater	38.5	38.0	37.6	36.9	35.1
Marine					
Demersal	6.9	6.6	5.8	6.0	6.0
Tuna-like	11.6	5.5	-	-	-
Total, Marine	18.5	12.1	5.8	6.0	6.0
Total, Fish	57.0	50.1	43.4	42.9	41.1
SHELLFISH					
Crabs	0.3	0.2	0.2	0.3	0.3
Spiny Lobster	0.1	0.1	0.1	0.1	0.1
Shrimp and Prawns	4.8	5.0	4.9	4.0	3.3
Mollusks	0.0	0.0	0.2	-	-
Total, Shellfish	5.2	5.3	5.4	4.4	3.7
OTHER					
Marine Turtles	0.0	0.0	0.0	0.0	0.0
Sea-Cucumbers	0.0	0.0	0.0	0.3	0.3
Marine Shells	0.0	0.0	0.0	0.1	0.1
Red Seaweed	1.7	3.8	3.0	3.0	3.0
Total, Other	1.7	3.8	3.0	3.4	3.4
GRAND TOTAL	63.9	59.2	51.8	50.7	48.2

Source: FAO. Yearbook of Fishery Statistics, 1974, pp. 299-300. (0.0 indicates negligible amount.)

III. ARTISANAL FISHERIES

A. General

Madagascar's estimated 49,000 inland artisanal fishermen harvested 38,500 t, or 60 percent of the country's total fisheries catch in 1974; all of it came from freshwater fisheries. The marine artisanal fishermen caught an additional estimated 9,000 t of fish, shellfish, and other marine products in 1974. Except for the tuna and shrimp fisheries, which are conducted primarily by commercial companies, Malagasy marine artisanal fisheries participated in every other saltwater fishery mentioned in table 1.

The artisanal catch fails to meet the nutritional requirements of the Malagasy people; there are too many mouths to feed. In 1974, Madagascar had an estimated population of over 7.5 million with an annual growth rate of more than 2 percent. The consumption of fish on Madagascar was about 6.1 kg per capita in 1974[1/]. Consumption of fishery products is not evenly distributed throughout the country. The lack of ice, refrigeration, transportation, and marketing facilities prevents the fish from reaching large numbers of potential consumers at reasonable cost. For these reasons, the prices of marine products in Tananarive are higher than the price of meat or freshwater fish.

Fishing and fish consumption therefore tend to follow the pattern found in many parts of the underdeveloped world: small, isolated fishing villages scattered along the coast subsisting on small, daily catches. The limited selling of freshly caught fish takes place within a 10-mile radius of the fishing villages (fig. 4).

Figure 4.--Fisherman selling sharks along the side of a road. These sharks were caught in a lagoon considered "safe for swimming" near Fort Dauphin. (c) Richard H. Martin.

1/ The figure of 6.1 kg does not include fishery products which are exported (mainly tuna and shrimp).

Some fish are also smoked or dried for sale in more distant towns or villages (fig. 5).

Figure 5.--A woman uses the traditional method of smoking fish on a grate over a straw fire. Unfortunately, this method burns the fish and destroys much of its protein content.

In the interior, fish farming augments income and provides an additional source of animal protein and is practiced together with the cultivation of rice. Small fishing villages, or even single families, also exist on the shores of rivers and lakes where the sale and consumption of fish is as high as that of coastal towns. Along the roadways, peddlers sometimes sell carp, tilapia, and eels caught in nearby lakes or rivers. In larger cities, a part of each market area is devoted to the sale of mainly freshwater fish collected by small trucks from as far as 50 miles.

In Tananarive, fresh fish is generally available and prices for freshwater species are considered reasonable for foreign residents and

Figure 6.--A small child sits quietly as her mother baits a hook.

for middle and upper class residents. For the lower classes the prices seem high. Those who cannot afford to buy fish on the market fish in the hundreds of flooded rice paddies in and around the city of Tananarive (fig. 6).

B. Freshwater Fisheries

Madagascar's freshwater fisheries include fish culture which has been the major source of freshwater fish for generations. Freshwater fish culture, especially in Madagascar's numerous rice paddies, was limited to only a few native species in the precolonial period. In 1857, following the establishment of a French protectorate, the first of a number of new species of freshwater fish was introduced and continued until 1959 (table 2).

Table 2.--Malagasy Republic. Species introduced for aquaculture

English name	Scientific name	Year introduced
True gorami	Osphronemus goramy	1857
Wild goldfish	Carassius auratus	1896
Mirror carp	Cyprinus carpio specularis	1914
Rainbow trout	Salmo gairdneri	1922
Common trout	Salmo trutta	1926
Mosquito fish	Gambusia holbrooki	1929
Black tilapia	Tilapia nigra	1950
False mouthbreeder	T. melanopleura	1951
Largemouth black bass	Micropterus salmoides	1951
St. Peter's fish	T. zillii, T. nilotica	1955-56
African mouth breeder	T. mossambica	1956
Royal carp	NA	1959

Prior to World War II, the emphasis was on the breeding of gamefish, which were released for sports fishing, highly popular with the French residents. After World War II, the development of artisanal fish culture was promoted to help feed Madagascar's population.

The Forestry Department established the Center for Research in Fish Culture in 1955. By 1959, research stations had been established in the Highlands at Lakes Alaotra, Kinkony, and Pangalanes. Pond and rice paddy culture was organized along with an educational program and the formation of a corps of skilled fishery technicians By the end of 1959, the Forestry Department reported over 72,000 fish ponds (table 3).

After Madagascar gained its independence from France in 1960, the administration of inland fisheries was transferred to the Centre Technique Forestier Tropical Français (CTFT) under an agreement between the two governments. The CTFT had eight experimental field stations and a headquarters in Tananarive (fig. 7).

Table 3.--Malagasy Republic. Fish ponds, by province, 1959

Province	Ponds
Fianarantsoa	59,000
Tananarive	12,000
Diego-Suarez	750
Tulear	200
Majunga	130
TOTAL	72,080

Figure 7.--A view of a hatchery in a forest reserve near Perinet. (c) Richard H. Martin

Research was carried out mainly in lake fisheries, although other programs were considered. Apparently the CTFT had some difficulties, because the country had only 85,000 fish ponds[1/] in 1969--an increase of only 12,920 ponds in 10 years. The breeding of fish in the rice fields requires careful control of the water supply. Poaching, dynamiting, and poisoning have been chronic problems inhibiting further development of fish culture.

In 1973, under the "Malgachisation policy[2/], the affiliation with CTFT ended and the Direction des Eaux et Forêts et de la Conservation des Sols (Directorate of Waters, Forests, and Soil Conservation) assumed control of inland fisheries research. Most of the facilities now owned by the Malagasy Government are well over 20 years old, and it does not appear that any major improvements have yet been undertaken to rejuvenate the programs or the facilities.

Besides fish culture, there is freshwater fishing in the island's 19 major lakes and in many rivers, streams, and reservoirs. Eels, freshwater crabs, and crayfish are usually harvested along with other freshwater species (fig. 8 and 9).

Figure 8.--This oasis spring in the southern desert contains several eels including one giant of 5 or 6 ft which has gained fame as a fertility symbol. The local women feed it rather well in the hope of improving their chances to have children. In some areas of Madagascar it is taboo to eat eels, but in the forest areas where they are found in ponds, they are caught by throwing poisonous leaves into the water which stun the eels and brings them to the surface. (c) Richard H. Martin.

Figure 9.--Small freshwater crabs for sale, strung on a cord. The crabs can reportedly be used to make a delicious soup. (c) Richard H. Martin.

1/ Almost all of these ponds are in the Central Highlands.

2/ The term denotes a process whereby the Malagasy Government expands state control of economic activity and replaces French nationals in administrative positions with Malagasy citizens.

C. Marine Fisheries

Little information is available on the number of marine artisanal fishermen in Madagascar. In 1970, the Malagasy Government estimated their number at about 2,000 full-time and 3,000 seasonal fishermen (who were also engaged in agriculture and the raising of livestock). The fleet comprises an estimated 2,000 small sailing craft and hand-powered outrigged canoes and pirogues. Some improvements have been made in recent years. Some canoes have been replaced by small boats that can be navigated better and can carry heavier loads. An attempt to provide motors has been made, but their economic viability is not certain because of the low fish prices. The artisanal fishermen employ dragged or dropped lines, nets, harpoons, dams, and traps (fig. 10).

Figure 10.--Artisanal fishermen in outrigger canoes.

Marine fisheries in Madagascar are divided into two parts: east coast and west coast. Along the eastern coast of Madagascar, fisheries bear the brunt of strong southeasterly winds and heavy seas that sweep across the Indian Ocean before rolling ashore (fig. 11).

Figure 11.--One of the Malagasy Republic's Indian Ocean beaches. (c) Richard H. Martin.

There is virtually no continental shelf along much of this rugged coastline, and the waters contain little plankton to sustain fish populations.

On Madagascar's western coast, however, conditions are ideal. The waters are calmer, the coast line is dotted with small coves, inlets, islands, mangrove swamps, and estuaries. An outlying fringe of coral reefs further protects the coastline. The continental shelf meanders offshore from 10 to 50 miles. Fishing along the western shore of Madagascar is therefore easier and more productive, and most artisanal fishermen exploit the waters of this region.

1. Marine Turtles[1/]

Turtle or "fano" fishing is a small, but important fishery. The southwestern coast near Tulear has a long stretch of reef. Between the reef and the coast are thousands of acres of underwater grasslands where the herbivorous green sea turtles (Chelonia mydas) feed. The Vezo and Sakalava tribesmen of the area call this turtle "fanojoaty." The Vezo tribesmen harvest an estimated 13,000 turtles a year, about half of which are green sea turtles. Fishing is done from pirogues or outrigger canoes (fig. 12).

Figure 12.--Malagasy fishermen use outrigger canoes to catch both fish and turtles. The canoes are deployed in a semicircle, forcing the catch toward the beach where, hemmed in by nets, the fish and turtles are speared.

Barbed, single-bladed harpoons ("teza" or "samona") are used. The fishermen also carry a third harpoon ("kisaisnitsa") for spearing fish.

1/ The material for this section was derived from J. Frazier: "The Status of Knowledge on Marine Turtles in the Western Indian Ocean," July 1975, Nairobi, Kenya, and George R. Hughes, "Fano!", published in: Defenders of Wildlife, 50(2), April 1975, Washington, D.C., pp. 159-163.

The fishermen of this region also hunt the hawksbill turtle (Eretmochelys imbricata)[1], the olive ridley turtle (Lepidochelys olivacea), and the loggerhead turtle (Caretta caretta). The leatherback turtle (Demochelys coriacea)[2] is rarely hunted because of its great size and tough shell.

The green sea turtle is abundant in Madagascar and is reportedly in no danger from overfishing since its principal breeding grounds are on Europa Island, off the southwestern coast of Madagascar, which is protected by the Government (fig. 13). The hawksbill turtle, however,

Figure 13.--Green sea turtle coming ashore to lay its eggs. (c) George H. Hughes.

is under serious pressure because its shell has been exported since 1613 when Arab traders first came to Madagascar. Hawksbill turtle shell necklaces, bracelets, rings, combs, earrings, etc., are still sold to tourists throughout the country. The loggerhead turtle is also threatened. Legislation, passed in 1923 protected females laying eggs and individual turtles with plastrons less than 50 cm, and designated six islands off Madagascar's western coast as turtle reserves. The Government's conservation measures have not been entirely sucessful as loggerheads are still killed when they come ashore to lay their eggs. Local fishermen have practiced this form of harvesting for years and see no reason to delay their harvest until after the females have laid their eggs (fig. 14).

1/ Called "fanohara" by the native fishermen.
2/ Called "valozoro" by the native fishermen.

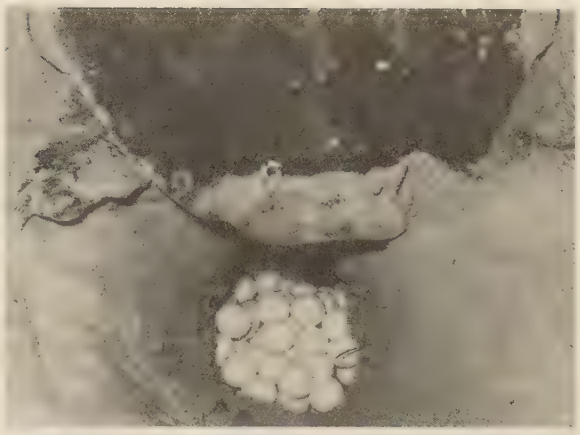


Figure 14.--Loggerhead turtle laying its eggs. (c) George H. Hughes.

The Malagasy Republic signed the Convention on International Trade and Endangered Species of Wild Fauna and Flora on April 4, 1973. The Convention became effective July 1, 1975, and prohibits the importation of all sea turtles and their products by citizens of the countries which ratified the Convention. The Malagasy Republic reportedly exported 0.6 t of sea turtle products in 1974, only one-third the 1973 exports of 1.8 tons[3].

2. Oyster Culture

A small-scale fishery that has potential for development is the culture of oysters. The Service de la Pêche Maritime has constructed two sites for oyster culture; Katsepe in Majunga Province and Sarodrano in Tulear Province. The Service is raising experimentally 50,000 oysters at Katsepe and 40,000 oysters in Sarodrano. The Service hopes to eventually harvest 100 t of oysters annually. Seven oyster species are being tested for commercial culture: Ostrea vitrefacta sowerby, Gryphea forskali glomerata, G. inaequivalvis arboricola, Pycnodonta imbricata, P. hyotis, Ostrea crenulitera, and O. cristagalli. Oyster harvesting remains a small operation, but if the two oyster culture projects achieve their goals it is possible that oyster farming may be practiced commercially in the future.

3/Some turtles are classified by the U.S. Goverment as endangered species, and the remaining ones are being considered for the endangered species list. The U.S. Endangered Species Act of 1973 prohibits the importation into the United States of threatened or endangered species and their parts or products. A diplomatic note concerning the Endangered Species Act was presented to the Malagasy Government in 1975.

3. Lobster

A small-scale fishing center was organized at Faux Cap, in the far south, by engineers of the Union for Equipment and Modernization of Farming Communities and those of the BDPA (Bureau pour le Developpement de la Production Agricole; Bureau for the Development of Agricultural Production) within the framework of an operation called "Androy Maritime." They have converted some 120 livestock breeders and farmers to fishing and lobstering. In addition, experienced fishermen were brought in to harvest lobster in some uninhabited areas. The lobster species (Panulirus penicillatus, P. versicolor, and P. homarus) are caught either by diving or by using wooden traps baited with mussels. Because many of the fishing villages are inaccessible, the lobsters are picked up by a small aircraft for delivery to Fort-Dauphin where they are packed aboard Air Madagascar jet planes for delivery to Tananarive. The lobsters are then flown to Paris either by Air Madagascar or by Air France. In 1974, the Malagasy Republic exported 87 t of live lobster to France, compared to 112 t in 1973.

4. Other species

Another important fishery in these southern waters is the collection of red seaweeds for export to Japan and Norway. A U.S. company was reportedly involved in this activity, but there is no current information on this firm or its operations. Local fishermen are believed to do the harvesting. The operation must be fairly well developed, since 757 t of seaweeds were exported in 1973 and 338 t in 1974.

Figure 15.--Crabs for sale in the market place in Tananarive. (c) Richard H. Martin.

Local fishermen also catch a variety of marine fish[1/], mollusks, and crustaceans (fig. 15). Madagascar lists crabs, oysters, shrimp[2/], mollusk shells, sea cucumbers, and shark fins among its marine fishery exports. These products are harvested mainly by artisanal marine fishermen.

5. Cooperatives[3/]

The General Commission for Cooperation, with the technical aid of the Service de la Pêche Maritime, has established two cooperatives: one is at Morondava and the other at Nosy-Bé. The cooperative fishermen come from nearby villages.

The Morondava Cooperative, organized in June 1963, assists in harvesting, processing, transporting, and marketing the catch of its members. With investments of 14.1 million Malagasy francs, this cooperative obtained shore facilities, including a refrigeration plant, a motorized sailboat with an ice container, and adequate nets. The Morondava Cooperative is one of the principal suppliers of marine fish to the Tananarive market and exports its products to Réunion, a French possession in the Indian Ocean. The cooperative is also beginning lobster and shrimp fishing. A Lebanese company, PACFREEZ, which conducted exploratory fishing off Morandava for shrimp and lobster under a protocol agreement with the Malagasy Government, trained members of the cooperative in modern procedures and purchased all their shrimp and lobster catch at preferential prices.

The Nosy-Bé Cooperative was organized in March 1963. It has a shore refrigeration plant, motorized boats, dories, and canoes. Its catch, varying from 40 to 70 t, is tied directly to trade. It is not economically feasible to transport fishery products from Tananarive to Nosy-Bé by plane. A transport study and trials have been made of transport to Tamatava by sea. The Nosy-Bé cooperative also exports frozen fish to Réunion by sea; however, infrequent sailings limit the cooperative's ability to supply the Réunion market.

The Service de la Pêche Maritime undertook, in 1974, a fisheries training program to assist artisanal fishermen of Majunga city. However, despite the widespread publicity, only six fish-

1/ Common species include the Epinephelus (mullets or meros), the Lethrinidae and Lutianidae (gurnards), and the otoliths (banana fish).

2/ Coastal shrimp traditionally are caught by installing "dams" at high tide.

3/ The source for this chapter was an article, "What is the Status of Deep Sea Fishing in Madagascar?" Info Madagascar (February 14, 1970), pp. 1-8. The article was translated by the Language Services Division of the Office of International Fisheries, NMFS.

ermen showed up to take advantage of the program. These men were given new, 7- to 8-m wooden boats with inboard diesel engines. The program showed that the new vessels and gear could be productive; however, most of the fishermen either worked less because of increased catches or quickly spent their newly gained wealth. The vessels have since been turned over to commercial fisheries.

Figure 16.--A fisherman poles homeward, casually standing in his easily tipped canoe. His stick, sharpened at one end, doubles as a harpoon for spearing fish in the coral-encrusted Indian Ocean shallows. The squat lighthouse rises above Sorcerers' Point on tiny Sainte Marie island. (c) National Geographic Society.

D. SUMMARY

Madagascar's artisanal fisheries remain primitive, isolated, and inefficient. Island fisheries, under the Direction des Eaux et Forêts et de la Conservation des Sols, appear to be stagnant. Marine fisheries, under the Service de la Pêche Maritime, are limited by funding priorities, lack of staff, and the need to develop or maintain commercial fisheries. Development of artisanal marine fisheries is, therefore, likely to proceed at a slow pace.

Some modernization of artisanal marine fisheries in the vicinity of commercial fishing grounds will continue as fishermen are brought aboard modern vessels as crewmen or as they observe and adopt new gear and methods. As the commercial fisheries succeed in establishing sales and distribution chains for their incidental catches of finfish, it is likely that artisanal fishermen may be able to sell their catches to the industry, thus augmenting their income. However, development in the more isolated fishing villages will have to await the construction of roads linking the villages with the rest of the country.

IV. COMMERCIAL FISHERIES

A. General

Madagascar has a small,but healthy commercial fishing industry, which in 1973 employed about 6,000 Malagasy fishermen in the shrimp and skipjack tuna fisheries. Since 1966, when shrimp fishing began in earnest, the industry has developed steadily. However, in 1974 delayed rains disturbed Madagascar's shrimp reproduction cycle resulting in lower catches. All of Madagascar's commercial fisheries are also facing increased fuel prices and general inflation. Worldwide fluctuations in the prices of tuna and shrimp have caused some difficulties. Governmental changes and new investment policies have led to additional delays in expanding the industry. However, the Malagasy commercial fishing companies are optimistic about the future, and further development can be anticipated.

B. Shrimp Fisheries and Companies

Shrimp remains the most important fishery in Madagascar. Six species are commonly found in the surrounding waters. The most abundant is Penaeus indicus, which accounts for 90 to 95 percent of the total shrimp catch. Other species include Penaeus monodon, P. japonicus, P. semisulcatus, Metapenaeus monoceros, and M. stebbingi. There are some signs that Madagascar's coastal shrimp fishery may be reaching the maximum sustainable yield (MSY). However, discoveries of additional stocks of deepwater species may allow for greater catches in the future.

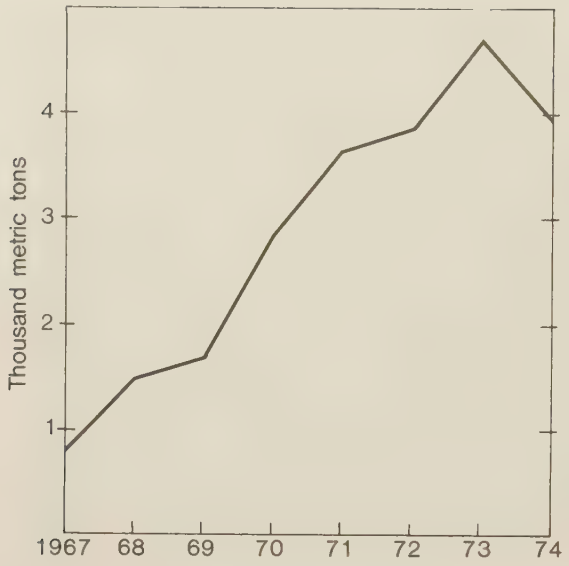
Commercial shrimp fishing in Madagascar began in 1966. Catches increased steadily through 1973, then decreased by 704 t or 15 percent in 1974 (fig. 17)[1/]. However, preliminary figures for 1975 indicate the shrimp catch may have amounted to approximately 5,800 tons.

1. History

Shrimp first attracted the interest of a commercial firm in Madagascar in 1951. The Fourmanoir Company used an old sailing yacht, the Gabriel II, to seek shrimp along the coast of Majunga on Madagascar's west coast. The cruise resulted in catches of penaeid shrimp. No additional information is available on this company; presumably it went out of business.

In 1958, a new effort was made to survey local shrimp resources by using three research vessels; the Malagasy Government-owned Alexis Lalane, the French research vessel ORSTOM-I,

1/ The data contained in fig. 17 differ from the FAO data in table 1. The difference may be due to inclusion in table 1 of the artisanal catch.



YEAR	QUANTITY --metric tons--
1966	n.a.
1967	832
1968	1,507
1969	1,705
1970	2,886
1971	3,661
1972	3,895
1973	4,703
1974	3,999

Figure 17.--Malagasy Republic. Commercial shrimp catch, 1967. (Source: Ministère du Développement Rural, Service de la Pêche Maritime. Direction de l'Elevage et de la Pêche Maritime. Statistiques des Pêches Maritimes, Madagascar, various years.)

and a vessel identified only as Ambariaka. This research effort lasted until 1960. The results were published by the Office de la Recherche Scientifique et Technique d'Outre Mer (ORSTOM) as "Les Crevette Penaeides du Plateau Continental Malagache."

On November 22, 1962, the Malagasy Government and the Kawakami Company of Japan signed an agreement that permitted the Japanese to fish experimentally for shrimp in Malagasy waters. The Chidorigo, a shrimper of 20 gross registered tons (GRT), was sent to fish between Nosy-Bé and Besalampy in northwestern Madagascar (fig. 1) between January and May 1965. The results of the cruise were published by the Service de la Pêche Maritime as "Pêche Crevettières à Madagascar".

The next phase involved the establishment of several joint ventures and the beginning of commercial fishing operations. The four most important shrimp fishing firms are FAMAKO, PNB, SIPMAD, and SOMAPECHE (appendix A). The firms harvested a total of 3,993 t of shrimp in 1974, or almost 99 percent of the total Malagasy shrimp catch.

2. Fanjonoana Malagasy Kowetiana (FAMAKO) Shrimp Company
Jean Marie Rakotomalala, President
Hassan Hafex, Director General
Boite Postale 57
Majunga, Malagasy Republic

A Lebanese company called PACFREEZ from Beirut signed an agreement with the Malagasy Government in November 1967, allowing it to operate two French-built trawlers in local waters. The 81-foot, steel, double-rigged, refrigerated shrimp trawlers, the Helou-I and II, fished in waters off Morondava and landed 61 t of shrimp. In December 1968, PACFREEZ brought in three additional vessels, the Taroob-V and VI and the Raschid-XX. The company then established a joint venture called "Grande Pêcherie de l'Ouest (GPO). Three additional vessels were added to the fleet. In early 1974, a group of business men from United Fisheries company in Kuwait visited Madagascar and announced that they would purchase the shares owned by the Lebanese. On June 28, 1974, the Kuwait firm paid US$1 million and obtained a 49 percent interest in the firm, which was renamed "Fanjonoana Malagasy Kowetiana."

The FAMAKO company operated 13 trawlers in 1974. The firm, which has no shore facilities (a fact noted unhappily by the Malagasy Government), employed 264 workers, including 64 foreigners. The entire catch is processed aboard the trawlers. Since initiating operations in 1967, the company's shrimp catch has increased to 1,427 tons (table 4).

Table 4.--FAMAKO (and ex-GPO) shrimp catch, 1967-74

YEAR	QUANTITY --metric tons--
1967	61
1968	160
1969	787
1971	1,310
1972	1,735
1973	1,659
1974	1,427

The catch is exported to the United States, Japan, France, and Réunion.

3. Pêcheries de Nosy-Bé (PNB)
In March 1967, an effort was made to fish from Majunga northward as far as Diego-Suarez by "the Société et Compagnie" under the name of "Les Pêcheries de Nosy-Bé." The effort lasted until March 1968. A period of refinancing followed,

and exploratory effort was not resumed until commercial operations began in 1970. By 1974, this French-owned company operated eight vessels and had a shore freezing plant in Nosy-Bé with a shrimp freezing capability of 6 t/day. The processed shrimp can be stored in a 400 m^3 (520 yd^3) cold storage. The PNB can produce 7 t of ice per day for its fleet. Between 1971 and 1974, Pêcheries de Nosy-Bé's catch increased 350 percent to nearly 750 t (table 5).

Table 5.--PNB shrimp catch, 1971-74

YEAR	QUANTITY
	--metric tons--
1974	749
1973	404
1972	364
1971	213

The increase in the 1974 catch was due to the addition of four new trawlers.

4. Société de Pêche à Madagascar (SIPMAD)
c/o SOSUMAV
Ambilobe, Malagasy Republic

In March 1966, a group of sugar manufacturers known as "Société Sucrière de la Mahavavy (SOSUMAV) and the company "Groupes des Sucreries de St. Louis à Marseille," began experimental shrimp fishing with the 65-ft, refrigerated trawler Soavina I. The Gulf of Mexico-type vessel had a 220-hp, turbocharged Caterpillar engine, a freezing capacity of 2 t/day, and a storage capability of 35 t of shrimp. The company began its operations under the name "Société Industrielle de Pêche à Madagascar" (SIPAM). In 1969, two additional vessels, the Soavina-II and III were added, and at that point the company was renamed the "Société Industrielle de Pêche de Madagascar (SIPMAD)."

The company, based at Diego-Suarez in northern Madagascar (fig. 1), operates three 283-GRT vessels. Five other vessels are also attached to the fleet; all the vessels are named Soavina. SIPMAD has a plate-freezing plant that can freeze 4 t of shrimp per day. The company also owns a 583 m^3 (675 ft^3) cold storage facility and can produce 7.5 t of ice per day. The entire catch is exported to France and to the island of Réunion. Since 1968, SIPMAD's shrimp catches have fluctuated significantly (table 6).

Table 6.--SIPMAD shrimp catch, 1968-74

YEAR	QUANTITY
	--metric tons--
1974	729
1973	1,031
1972	318
1971	164
1970	154
1969	45
1968	100

In March 1972, it was reported that the Japanese fishery firm Kyokuyo and the Marubeni Trading Company had established a joint venture with SIPMAD (48.6 percent Japanese ownership and 51.4 percent Malagasy ownership). The Japanese were reportedly supplying the funds for the purchase of five 100-GRT shrimp trawlers in Japan[1/].

5. Société Malagache de Pêcherie (SOMAPECHE)

SOMAPECHE was the first commercial fishing company established in Madagascar; it was the direct outcome of the survey cruise in 1965 by the Chidorigo, a vessel owned by the Kawakami Company. On July 13, 1965, about a month after the cruise ended, the Société Malagache de Pêcherie was established with the Malagasy Government owning 7.5 percent, the Société CODAL 39.0 percent, the Kawakami Trading Company of Japan 7.4 percent, Higashi-Taihligo 5.1 percent, and Taiyo Gyogyo 41.0 per cent. Shrimping began in 1966 from Majunga with two Japanese trawlers, the Boina and the Menabe. In 1967, four additional 16-m Japanese shrimp trawlers joined the firm.

By 1974, SOMAPECHE had a fleet of 11 vessels. The Majunga-based firm has a processing plant considered to be one of the finest in Africa. Its freezer can process up to 15 t of shrimp per day at -45°C; the processed shrimp can then be stored at -20°C in a 140-t cold storage with a 550-m^3 (700 yd^3) capacity. Most of the company's product is exported to Japan; sales are handled by Taiyo. The shrimp is packed, headless, in 2.5-kg boxes. SOMAPECHE handles sales on Madagascar, in France, and in Réunion through Société CODAL. The firm also has a facility for processing shrimp shells into shrimp meal. The incidental catches of finfish (which were 90 t in 1974) are either sold locally or marketed in Tananarive. SOMAPECHE's vessels harvested almost 1,100 t of shrimp in 1974, considerably less than the annual harvests of nearly 2,000 t in 1970 and 1971 (table 7).

Table 7.--SOMAPECHE shrimp catch, 1967-74

YEAR	QUANTITY
	--metric tons--
1974	1,088
1973	1,583
1972	1,474
1971	1,974
1970	1,945
1969	1,500
1968	1,090
1967	771

SOMAPECHE currently employs 310 people, including 4 Japanese executives, 30 foreign managers and technicians, 4 local engineers, 63 crewmen, and 189 workers at the freezing and reduction plants.

1/ Nihon Suisan Shimbun of March 3, 1972.

As of 1974, the company operated 10 shrimp trawlers (four 45-GRT trawlers, one 100-GRT trawler, four 96-GRT trawlers, one 125-GRT trawler) and 1 350-GRT freezer/factoryship. The firm's vessels are named: Boina I, II, and III, Menabe I and II, Nosy Faly, Nosy Mangabe, Mandrare, Vezo, and Anahidrano.

6. Others

A number of other firms catch small quantities of shrimp. SOPEMAR operates out of Tamatave with one stern trawler and one other vessel. In 1974, the firm caught 36 t of shrimp and 101 t of fish. Pêcheries de l'Est was established in 1971 at Tamatave. The company is primarily in the finfish business. The firm did not catch any shrimp between 1971 and 1973, but in 1974 the company's 3 vessels caught 1.2 tons. Pêcherie de Karandava is a small fish company that reported catching 1.6 t of shrimp in 1972 and 1.2 t in 1974. Armement de M. Kergosien reportedly caught 2.8 t of shrimp in 1972. A fisheries cooperative, Société de Promotion da la Pêche Artisanale (SOPROPA) reportedly caught about 25.6 t of shrimp in 1973[1/].

Figure 18.--Skipjack tuna being loaded into the cold storage hold of a vessel belonging to the Malagasy-Japanese joint venture company, COMANIP.

Figure 19.--A commercial tuna vessel and Malagasy artisanal fishermen in their dug-out canoes. The Malagasy Government hopes that exposure to modern commercial operations will help introduce modern gear and methods to the native fishermen.

C. Tuna Fisheries and Companies

1. Initiation of Commercial Tuna Operations.

Commercial tuna fishing in Madagascar is still in its infancy, but 5,500 t tuna-like species were caught in 1973 and 11,600 t in 1974 (table 1). The growth of the fishery was interrupted when tuna prices declined worldwide and fuel prices increased in 1975.

The tuna fishery was initiated in 1972 when two Japanese tuna companies and two Malagasy-Japanese joint ventures engaged in exploratory and commercial tuna fishing, mainly off the northwest coast of Madagascar[1/]. Significant seasonal and geographic variations in the amount of tuna caught were encountered[2/]. Skipjack tuna (Katsuwonus pelamis) and yellowfin tuna (Thunnus albacores) made up over 99 percent of the catch in 1972 and 1973. On the average, yellowfin represented only about 10 percent of the total catch. The percentage of yellowfin in the total catch fluctuated markedly. During the first part of the year, yellowfin was never more than 3.5 percent of the catch, while during the second 6 months it averaged 17 to 18 percent.

Based on the 2 years of exploratory and commercial tuna fishing by the two Japanese tuna companies and two Japanese-Malagasy joint ventures, five conclusions were reached:

1/ A statistical summary of the fishing effort and skipjack catch for each of the four companies is detailed in appendices B and C.

2/ An indication of the yields of zones fished by months is presented in appendix D.

1) Daily yields in the tuna catch reach a minimum in August and are highest from January to June, when the average yield per vessel exceeds 5 t a day.

2) The best yields were obtained in the northern sectors of the waters fished, near Aldabra and Cosmoledo Islands.

3) Skipjack was never found in large quantities near the Madagascar coast, but more yellowfin was caught during October, November, and December in coastal waters than on the high seas.

4) The skipjack's reaction to the bait may well be more important than the size of the fish schools in determining the catch.

5) Waters near Nosy-Bé contain enough bait stocks to supply about 10, or possibly even more, vessels; however, because of the small stock area, regular assessments of the stocks of bait fish are necessary to prevent their depletion.

At the present time only three firms are involved in the Malagasy tuna fisheries (appendix E).

2. Compagnie Malgache et Nippone de Pêcherie (COMANIP)
Alfred Raboanarijaona, President and Director General
IT, 23 Lalana Rainibetsimisaraka
Tananarive, Malagasy Republic

COMANIP was established in early 1973 as a joint venture with 51 percent Malagasy ownership and 49 percent ownership by Kaigai Gyogyo of Japan. The Nosy-Bé based company was established after the Kaigai company deployed three skipjack pole-and-line vessels (Kaisei Maru Nos. 51, 52, and 53) in 1972 to conduct exploratory fishing for tuna. The vessels caught a total of 4,037 t as follows: 3,795 t of skipjack, 210 t of yellowfin, 13 t of bigeye, 13 t of miscelaneous tuna, and 5 t of miscellaneous fish. COMANIP commercial fishing began in May 1973 with five, 8-year-old, leased skipjack pole-and-line fishing vessels, COMANIP Nos. 1, 2, 3[1/], 5 and 6 (fig. 20). Four additional 35-m vessels, COMANIP Nos. 7, 8, 9, and 10 were added to the fleet in 1974. Each of the nine vessels has a capacity of 190 GRT and is equipped with a 750-hp engine. COMANIP has recently ordered 10 of the same type to replace the older vessels. The new vessels will have the same name as their predecessors. COMANIP'S vessels have been manned by Japanese, Korean, and Malagasy crewmen (fig. 21). The firm also leased two freezer vessels, Seabird Nos. 8 and 31 (fig. 18), to store the catch; the two freezer vessels terminated their leases and left in April 1975. The firm reportedly caught 3,782 t of fish in 1973 and 11,184 t in 1974. No species breakdown is available, but skipjack is reportedly the main species caught.

Figure 20.--COMANIP Nos. 3 and 5 tied up alongside the freezer-cargo vessels seabird Nos. 8 and 31 at Nosy-Bé.

Figure 21.--A COMANIP skipjack pole-and-line fishing vessel in the Indian Ocean. The Malagasy crew operates under the guidance of a Japanese fishing master.

COMANIP planned to begin a $3.5 million expansion program in September 1975 to upgrade its fleet and to build shore facilities. The company's president explained that the firm's plans entail the construction of a 1,500-t cold storage facility capable of storing tuna at -30°C and a smoke-house for processing some of the tuna. The company will also install a 12 t/day ice-making plant and will construct an 80 t/day brine freezing system able to freeze the catch at -20°C.

1/ The reason that no vessel was given number four is the fact that the Japanese are afraid of that number. In Japanese it rhymes with the word death. The number is therefore avoided, as the number 13 is in the United States.

In 1974, A. Raboanarijaona, one of Madagascar's most successful businessmen (fig. 22),

Figure 22.--Alfred Raboanarijaona, President and Director General of COMANIP.

purchased 10 Japanese pole-and-line tuna vessels of which 5 are used and 5 will be constructed in Japan. No information is available on the used vessels; however, the newly built 60-ton, 31-m vessels will have a speed of 12.5 knots, a crew of 26, and will be equipped with Daihatsu diesel engines. Raboanarijaona is well thought of in Madagascar's Government and has been asked to assume greater responsibility in developing the nation's fisheries. He recently went to Spain and Portugal where he found buyers for his company's skipjack catch. He is also interested in developing a sardine fishery for his country. He is pleased with the present working relations between COMANIP and its Japanese partners, but is also interested in developing ties with the United States. This is especially true for the sardine industry since he hopes, eventually, to construct a sardine cannery. These plans, however, will be influenced by the world tuna market, which will determine the working capital available for such ventures.

3. Toshou. Ltd.
Kazu Uemura, Director
Société Toshoku
Cite Planton
Tananarive, Malagasy Republic

On November 25, 1972, the Malagasy Government gave the Japanese trading firm Toshoku, Ltd. permission to fish experimentally for tuna during 1973. The company reportedly caught almost 550 t of fish in 1973, but no catches were reported in 1974. At present, the company does no fishing.

According to T. Yamaki, Chief Agent for Toshoku in Tamatave, the company now transhipps tuna and allied species from 1 Taiwanese (ROC) and 20 South Korean (ROK) tuna longliners which were operating out of Tamatave in July 1975[1/]. The catches are off-loaded in a customs area directly onto the Itsukushima Maru, a 5,000-GRT freezer vessel capable of storing 3,000 t of fish at -30°C. Toshoku is leasing the vessel from another Japanese company, Nihon Suisan. According to Uemura, his company, together with Japan Express, Teijin, Kyokuyo Hogei, and Nippon Reizo companies, was supposed to approach the Malagasy Government with a joint-venture proposal in late 1975 which will include the possible construction of a 2,500-t cold storage facility. Because of the unstable Malagasy political situation, the firm has decided to postpone this commitment.

4. Société Malagache Nippone de Viande Concentrée (MANIVICO)

This joint venture company, which includes Nichiro, won the Malagasy Government's approval on July 19, 1973, to fish experimentally for sardines, sardinellas, pilchards, and tuna. The Kuroshio Maru No. 72 was brought in to conduct this experimental fishery. During 1973, the vessel landed over 190 t of fish. In 1974, the vessel fished only through August, but landed nearly 400 t of fish. During the last quarter of 1974, the company installed a net across the mouth of the Diego-Suarez river and caught 9 t of fish. The company did no fishing in 1975.

D. Finfish Fisheries

A few small-scale finfish operations can be classified as commercial fishing. The most important of these is the Pêcheries de l'Est. This company, established in 1971, is based in Tamatave on Madagascar's rugged eastern coast. The firm operates three vessels, two of which can hold 2 t of iced fish and the other vessel only 0.7 t of fish. A total of 10 men work aboard the three vessels. The company maintains three cold storage rooms with a 50-m^3 (65 yd^3) capacity and has nine workers. Most of the catch is sold locally; only about 2 percent is exported to Réunion. The firm fishes from the

1/ This represents a sizeable reduction in the number of vessels compared to November 1974, when 43 ROK and 2 ROC longliners fished out of Tamatave.

island of Sainte Marie southward as far as Mahanoro (fig. 1). The fishing season is in May and June and from September to December; heavy seas during the rest of the year make operations impossible.

Among the species reportedly caught by the company are the following: cabot (Tompet blenny), capitaine (Lethrinus spp.), tazar (Sphyraenella flavicauda), vara var (Lutianus bohar), chien de mer (dogfish), albacore tuna, yellowfin tuna, Carangidae, madame tombe (Thalliurus chlorurus), and dorade (Coryphaena hippurus). Other species are also caught, but they are referred to only by local names and cannot be easily identified.

SOPEMAR is another company that fishes out of Tamatave; it has two vessels, one of which is a stern trawler. In 1974, the firm caught over 100 t of fish. Another firm, Makoa Meng, also operates a finfish enterprise that caught 5.5 t of fish in 1974. A United States firm reportedly has been involved in harvesting seaweeds in Madagascar, but no current information is available on this operation.

V. LABOR

The salaries of commercial fishermen are established by the Directorate de la Marine Marchande (Merchant Marine Directorate of the Malagasy Ministry of Transport). They are the same as those for merchant marine seamen. Monthly wages vary depending on fisherman's employment (coastal or deep-sea fishing) and the type of duties he performs. The most recent wage scale was established on March 1, 1976: monthly wages range from a low of $35.85 to a high of $155.78 (appendix F). In addition to their salaries, Malagasy fishermen also receive free meals, a 0.5 to 1 percent commission on the proceeds from the catch, and an annual bonus of an additional month's salary (the so-called "13th" monthly salary).

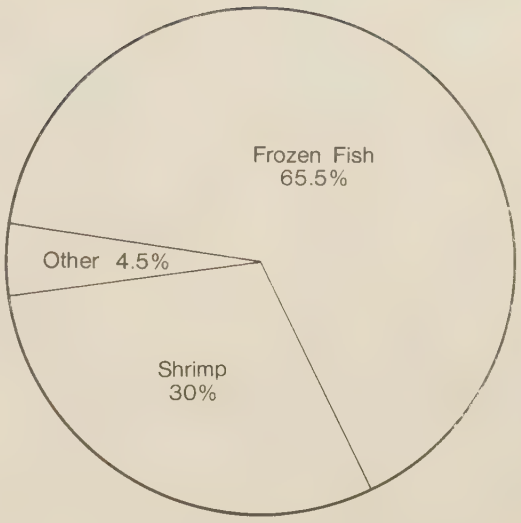


Figure 22.--Malagasy Republic. Fishery exports by commodity, 1974 (in percent of total).

Table 8.--Malagasy Republic. Fishery exports, by quantity, 1973-74

	1974	1973
	--metric tons--	
FISH		
Frozen	10,071.4	3,668.6
Dried-salted	173.3	124.4
Total, fish	10,244.7	3,792.0
SHELLFISH		
Shrimp:		
Fresh or frozen	4,579.5	2,973.8
Boiled	.7	-
Dried	20.5	9.4
Meal	.7	-
Total, shrimp	4,601.4	2,983.2
Crabs:		
Live	6.5	33.4
Frozen	10.9	-
Total, crabs	17.4	33.4
Lobsters:		
Live	87.2	111.9
Lobster (cont'd):		
Frozen	10.0	-
Cooked and frozen	11.8	.4
Total, lobsters	109.0	112.3
Shellfish, total	4,727.8	3,128.9
MOLLUSKS		
Oysters	.1	.4
Octopus and cuttlefish	.0	-
Shells	16.4	145.2
Total, mollusk	16.5	145.6
OTHER		
Turtle	.6	1.8
Sea cucumbers	29.5	32.5
Sharkfins	12.3	7.9
Seaweeds	338.3	757.2
Total, other	380.7	799.4
TOTAL EXPORTS	15,369.7	7,865.9

Source: Ministère du Développement Rural. Direction de l'Elevage et de la Pêche Maritime. Service de la Pêche Maritime. Statistiques 1974 des Pêches Maritimes, Madagascar, 1975, p. 35.

VI. FISHERY EXPORTS

Malagasy 1974 fishery exports amounted to 15,370 t, an increase of 95 percent over 7,870 t exported in 1973 (table 8). Two commodities, frozen fish (primarily tuna) and shrimp, accounted for 95 percent of all Malagasy fishery exports in 1974 (fig. 22). Frozen fish exports exceeded 10,000 t in 1974, an increase of 175 percent over 3,800 t exported in 1973. Shrimp exports also increased significantly in 1974 to 4,600 t, or by 54 percent over 3,000 t exported in 1973.

A. Exports to the United States

The Malagasy Republic is one of the United States' major African suppliers of seafood products. Only one other African country, the Republic of South Africa, exported a greater quantity of fishery products to the U.S. in 1974 and only Mauritian and South African fishery exports were worth more (table 9). Total 1974 fishery exports to the United States amounted to 7,600 t, valued at US$5.6 million in 1974. This represented an increase from the 7,000 t, valued at US$4.6 million, exported in 1973 and included a small amount of seaweeds. Tuna is the most important Malagasy fisheries export to the United States. In 1974, the U.S. imported nearly 7,400 t of Madagascar's tuna valued at U.S. $5 million, or 91 percent of the value of all fishery exports to the United States. Small quantities of shrimp and seaweed were also imported from Madagascar (table 10). The data in table 10 are taken from U.S. import statistics. In some cases there are severe discrepancies with Malagasy export data. In 1973, the U.S. statistics show the quantity of tuna imported from Madagascar as being about 7,000 tons, while Malagasy statistics show that all tuna exports to all countries amounted to only 3,700 tons. The reasons for these variances are not known.

Table 9.--U.S. Imports of Fish and Shellfish from Africa, 1974

COUNTRY	QUANTITY Metric tons	VALUE US$ 1 million
Rep. of S. Africa	25,744	43.4
Malagasy Rep.	7,538	5.5
Mauritius	6,816	7.4
Ivory Coast	5,701	5.3
Canary Islands	4,671	5.4
Ghana	2,720	1.4
Senegal	2,314	.9
Sierra Leone	2,149	1.8
Kenya	2,138	2.5
Angola	1,676	1.6
Other	3,024	7.2
TOTAL	64,361	82.4

Source: U.S. Department of Commerce. Fisheries of the United States, 1974, Washington, D.C., March 1975, p. 40.

B. Japan

Malagasy 1973 fishery exports to Japan totaled almost 3,100 t, valued at over US$6.5 million (table 11). Frozen shrimp was the most important commodity comprising 93 percent of all Malagasy marine exports to Japan in 1973. Small amounts of tuna and tortoise shell were also exported.

C. France

Malagasy 1973 fishery exports to France totaled 568 t, valued at US$1.4 million (table 12). The principal export commodity was crustaceans. They amounted to 502 t with a value of over US$1.3 million and represented 96 percent of all fishery exports to France.

D. Réunion Island

Malagasy fishery exports to Réunion in 1973, amounting to 530 t and valued at US$700,000

Table 10.--Malagasy Republic. Exports of fishery products to the United States, 1973-74

COMMODITY	1974 QUANTITY metric tons	1974 VALUE US$ 1,000	1973 QUANTITY metric tons	1973 VALUE US$ 1,000
FISH				
Tuna, frozen				
Albacore	4,495	3,742	5,443	3,554
Skipjack	2,046	1,111	950	569
Other[1/]	857	212	564	140
Total, tuna	7,398	5,065	6,957	4,263
Shellfish				
Shrimp, frozen, shell-on	141	441	77	272
Other[2/]	-	-	12	33
Total, shellfish	141	441	89	305
Other[3/]	-	-	N.A.	1
SEAWEEDS	54	52	-	-
GRAND TOTAL	7,593	5,558	7,046	4,569

1/ Primarily yellowfin.
2/ Includes shrimp pastes and sauces.
3/ Fish and shellfish not for human consumption.
Source: U.S. Department of Commerce, Bureau of the Census, Imports for Consumption (manuscript).

(table 13) were mainly frozen fish and crustaceans. Frozen crustaceans alone accounted for 82 percent by value of all Malagasy exports to Réunion.

Table 11.--Malagasy Republic. Marine exports to Japan, 1973

COMMODITY	QUANTITY metric tons	VALUE US$ 1,000[2/]
Tuna, frozen	1,177.1[1/]	481
Shrimp, frozen	1,921.5	6,053
Shells		
Tortoise	0.4	9
Other	0.7	12
Total, shells	1.1	21
GRAND TOTAL [1/]	3,099.7	6,555

1/ Japanese official trade statistics show frozen tuna imports at 1,673.3 tons.
2/ Converted at the December 1973 exchange rate of US$1.00=206.1 CFA francs.

Table 12.--Malagasy Republic. Marine exports to France, 1973

COMMODITY	QUANTITY metric tons	VALUE US$1,000[3/]
Fish		
Frozen	0.0[2/]	0.0
Canned	0.0	0.0
Total, fish	0.0	0.0
Crustaceans		
Frozen	427.3	969.6
Other	75.1	373.2
Total, crustaceans[1/]	502.3	1,342.9
Shells		
Tortoise	0.4	6.5
Mollusk	50.6	32.8
Other	14.9	17.9
Total, shells[1/]	66.0	557.2
GRAND TOTAL[1/]	5,568.3	1,400.0

1/ Totals may not agree owing to rounding.
2/ Indicates that the amounts were less than 1 ton and value less than US$1,000.
3/ Converted at an exchange rate of US$1.00=206.1 CFA francs, December 31, 1973.

Table 13.--Malagasy Republic. Fishery exports to Réunion, 1973

COMMODITY	QUANTITY metric tons	VALUE US$1,000[2/]
FISH		
Frozen		
Freshwater	2.2	2.0
Marine	131.4	103.0
Dried		
Fish	7.5	4.2
Sharkfins	0.1	0.1
Total, fish[1/]	141.3	109.2
SHELLFISH		
Crustaceans		
Freshwater	12.4	7.1
Marine		
Frozen	352.2	580.0
Other	21.0	11.1
Mollusks		
Frozen	0.3	0.1
Other	0.5	0.2
Total, shellfish[1/]	386.4	598.4
SEA CUCUMBERS, DRIED	0.5	0.5
GRAND TOTAL[1/]	528.2	708.1

1/ Totals may not agree owing to rounding.
2/ Converted at the December 1973 exchange rate of US$1.00=206.1 CFA francs.

Source: (Tables 11, 12, and 13) Direction de la Statistique et de Recherche Economique. Statistiques du Commerce Exterieur de Madagascar, 1973.

VII. FISHERIES ADMINISTRATION

The Service de la Pêche Maritime and the Direction des Eaux et Forêts et de la Conservation des Sols (inland fisheries) both fall under the jurisdiction of the Ministry of Rural Development. The Service de la Pêche Maritime, established in 1957, has jurisdiction over marine fisheries. It employs about 100 people and since 1972 has been headed by by Andrianirina Ralison, a one-time member of FAO in Rome and a former biologist of the Service in Majunga. The Service's headquarters are on a small hill in Tananarive where numerous other government office buildings are also located. The headquarters office in Tananarive includes administrative, economic, and applied research branches. The Service also has a laboratory and a research vessel at Majunga and regional and subregional offices throughout the country. These regional offices are in (1) Majunga, (2) Diego Suarez, and Nosy-Bé, (3) Tulear, Morondava, Faux Cap, and Fort Dauphin, (4) Tamatave, Sainte Marie island, and (5) in Manajary. Each regional station has officials responsible for sanitation, food quality, improved gear and fishing techniques, and training of local fishermen.

VII. FISHING LIMITS

The Malagasy territorial sea limits were extended from 12 to 50 nautical miles by a law promulgated on September 28, 1973. The distance is measured from baselines established by Malagasy law. The 1973 law also establishes the limits of Madagascar's continental shelf, which is considered as an Exclusive Economic Zone extending 100 nautical miles beyond the territorial sea.

IX. RESEARCH (ORSTOM)

The French Overseas Office for Scientific and Technical Research (Office de la Recherche Scientifique et Technique Outre-Mer--ORSTOM) set

up a Center for Oceanography and Fisheries at Nosy-Bé in 1946. ORSTOM remained in Madagascar after the country gained its independence. It had six marine biology laboratories (three of which are fully equipped and air-conditioned), a laboratory for physical oceanography, a laboratory for human nutrition, library, aquarium, warehouses, workshops, staff accommodations, and a research vessel. The ORSTOM organization was closed in 1974 by the Malagasy Government for political reasons. French scientists who worked at the Nosy-Bé facility hope that negotiations to reopen the facility will begin in the near future, but they are uncertain as to the outcome. The loss of this facility affects the growth of Malagasy marine fisheries.

X. UNDP/FAO ASSISTANCE PROGRAMS

The Food and Agriculture Organization and the United Nations Development Program (UNDP/FAO) is active in Madagascar since 1968 when a Project Director was sent to the island to establish a program of exploratory fishing. Eventually, 24 fishery experts were engaged in this program which lasted until 1974 when the project was completed. The UNDP/FAO project involved research cruises on offshore waters from 200 to 600 meters deep. The findings of the surveys have not yet been released. However, FAO biologists have indicated that commercial quantities of snappers (Lutianidae and Lethrinidae), sea robins (Triglidae) and deepwater shrimp were found. The UNDP currently maintains an office in Tananarive, but this office has no fishery experts.

Sometime between the fall of 1975 and the fall of 1976, scientists from Madagascar may participate in an FAO-sponsored research cruise aboard the Soviet Union's fisheries research vessel Prof. Mesyatsev. The Soviets will study demersal stocks off Madagascar to a depth of 300 m and will also do research on the schooling of small pelagic fish. The cruise was announced at the Fourth Session of the Indian Ocean Fishery Commission, which was held in Mombasa, Kenya, 21-25 July 1975. Madagascar, although a member nation of the Commission, sent no delegates to the meeting.

XI. INVESTMENT OPPORTUNITIES

Investment opportunities for U.S. firms are limited. The political climate in Madagascar is in a state of flux, but it appears that the country will continue to follow a socialist path to development with the Government controlling most sectors of the economy. Although fisheries are an important part of the economy, they remain in private hands and will probably remain so as long as they continue to expand. The best possibilities for investment in Madagascar's fisheries would be in offshore tuna, snapper, and deepwater shrimp fishing, or in oyster culture. The Malagasy government and/or private concerns, would expect to control at least 50 percent of the shares in any joint venture.

XII. SALES OPPORTUNITIES FOR U.S. COMPANIES

The best sales opportunities appear to be in shrimp-processing machinery and refrigeration equipment. The market is limited to three or four firms. If deepwater shrimp proves to be a suitable resource for future harvesting, there will develop a market for deepwater trawlers, winches, and netting. There may also be a market for sardine-canning equipment. Literature on snapper boats and gear, and oyster culture and harvesting gear would be appreciated by the Service de la Pêche Maritime for use in future planning. Individuals or firms wishing to promote United States products in Madagascar are strongly urged to contact the American Embassy in Tananarive at the following address:

Economic/Commercial Officer
Embassy of the United States of America
14 and 16 rue Rainitovo
Antsahavola Boite Postale 620
Tananarive, Malagasy Republic

A copy of the letter should also be sent to:

Dennis Weidner
U.S. Department of Commerce, NOAA, NMFS
Office of International Fisheries, (F41)
International Fisheries Analysis Div.
Washington, D.C. 20235

XIII. PROBLEMS FACING MALAGASY FISHERIES

In discussions with the U.S. Regional Fisheries Attache for Africa, the Marine Fisheries Director, A. Ralison, outlined the following major problems facing Madagascar's fisheries.

A. Shrimp

Late, inadequate rainfall in the winter of 1973 disrupted the spawning cycle of shrimp. This reduced 1974 catches and very likely affected 1975 stock recruitment. As a result, the Service banned shrimp fishing from January 1 to February 28, 1975, i.e., during the winter rains. A limited fishery was permitted only between Cape Sebastien and Pointo d'Angadoka. Only 12 vessels were allowed to harvest shrimp there in 1975, but that number was increased to 23 in 1976. The Marine Fisheries Service wants to maintain a healthy shrimp industry and is therefore paying considerable attention to the preservation of shrimp stocks.

B. Trained Personnel

Many skilled fishery biologists and technicians left Madagascar in 1974, reportedly to seek higher paying jobs in other countries. The closing down of the ORSTOM facility and the termination of the UNDP/FAO project were major factors in the drain of skilled manpower which seriously affected fisheries research as well as commercial development of Malagasy fisheries.

C. Inflation

Fuel prices have increased by over 90 percent during 1972-75. Prices for engines, netting, cables, etc., have increased by over 30 percent during the same period. The wages of skilled fishermen have gone up by over 30 percent, and laborers are now receiving 18 percent higher wages than they did in 1972.

D. Falling Prices

The surge in prices for fuel, supplies, labor, etc., occurred at a time when world prices for shrimp and tuna nosedived after a long period of steady increases[1/]. The commercial sector that was already wrestling with the problems caused by reduced shrimp catches was severely affected. Ralison feels that a continued development of commercial fisheries will benefit the Malagasy economy, since almost the entire catch is exported to earn foreign currencies. Commercial fishing is in addition one of the most productive elements of the national economy, and its rapid development should be encouraged.

XIV. PERSONAL COMMENTS

Visitors to Madagascar should have no difficulty in reaching the country via Paris (Air France or Air Madagascar). It is a 3-hour flight to Tananarive from Nairobi, but flights are more limited. The Tananarive Hilton is in the center of town and offers excellent accommodations. Travelers should expect to spend $50 a day for food and lodging. Numerous shops specialize in semiprecious gems. Visitors to the island, especially to the city of Tananarive, should bring warm clothing, especially from June through September, since those are the winter months and the weather is chilly at 6,000 feet. Visitors must have a visa and updated medical certificates. Malaria pills are advisable for any travel in eastern Africa.

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XVI. ACKNOWLEDGEMENTS

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Appendix A.--Shrimp companies operating from Madagascar, 1974

ACRONYM	FAMAKO	PNB	SIPMAD	SOMAPECHE	SOPEMAR	SOPROPA
Company's Name	Fanjonoana Malagasy Kowetiana	Pêcheries de Nosy-Bé	Société de Pêche Madagascar	Société Malgache de Pêcherie	Sopemar	Société de Promotion de la Pêche Artisanale
Address or Headquarters	B.P. 57 Majunga		Diego-Suarez	Majunga	Tamatave	
Number of Vessels (in 1974)	13 trawlers	8 vessels	8 vessels	10 trawler 1 factoryship	2 vessels	
Shrimp Catch (in 1974)	1,430 t	750 t	730 t	1,090 t	36 t	25.6 t (in 1973)
Number of Employees	200 Malagasy 64 Foreign 264 Total			4 Japanese Executives 30 Foreign Managers 11 Malagasy Executives 4 Malagasy Engineers 63 Crewmen 89 Workers at Plant 201 Total		
Catch Sold to	U.S. Japan France Réunion Is.		France Réunion Is.	Mainly to Japan		
Facilities, Capacity and Location	No shore facilities	Shrimp-freezing plant, 6t/day, Nosy-Bé	Shrimp-freezing plant, 4t/day	Shrimp-freezing plant, 15t/day	Shrimp meal plant	
Storage Facilities	None	400 m3 cold storage	583 m3 cold storage	550 m3 cold storage		
Other Information		Can produce 7t of ice/day	Can produce 7.5t of ice/day	first commercial fishing venture established in Madagascar	1974 fish catch: 101 t	
Ownership	Malagasy/ Kuwait	French	Malagasy/ Japanese	Malagasy/Japanese		

Note: Two small companies, Pêcheries de l'Est and Pêcheries de Karandava each caught 1.2t of shrimp in 1974. In addition a third company, Armement de M. Kergosien, caught 2.8t of shrimp in 1972.

Appendix B.--Total fishing effort for bonito, by tuna company operating in Madagascar in 1973

COMPANY	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	1973
KGKK 12*	36(3)	3(2)											39 (3)
Toshoku 13*	14(1)	10(1)	13(1)	12(1)	11(1)	17(1)	13(1)	13(1)	4(1)				107(1)
Comanip 17*					42(5)	111(5)	117(9)	145(9)	147(9)	156(9)	171(9)	157(9)	1046(9)
Manibico 16*									4(1)	16(1)	16(1)	16(1)	52(1)
TOTAL	50(4)	13(3)	13(1)	12(1)	53(6)	128(6)	130(10)	158(10)	155(10)	172(10)	187(10)	173(10)	1244(14)

Note: The numbers in this table indicate the number of fishing days. Those in parentheses, the number of boats working. The numbers marked with an asterisk give the average number of fishing days per month per company.

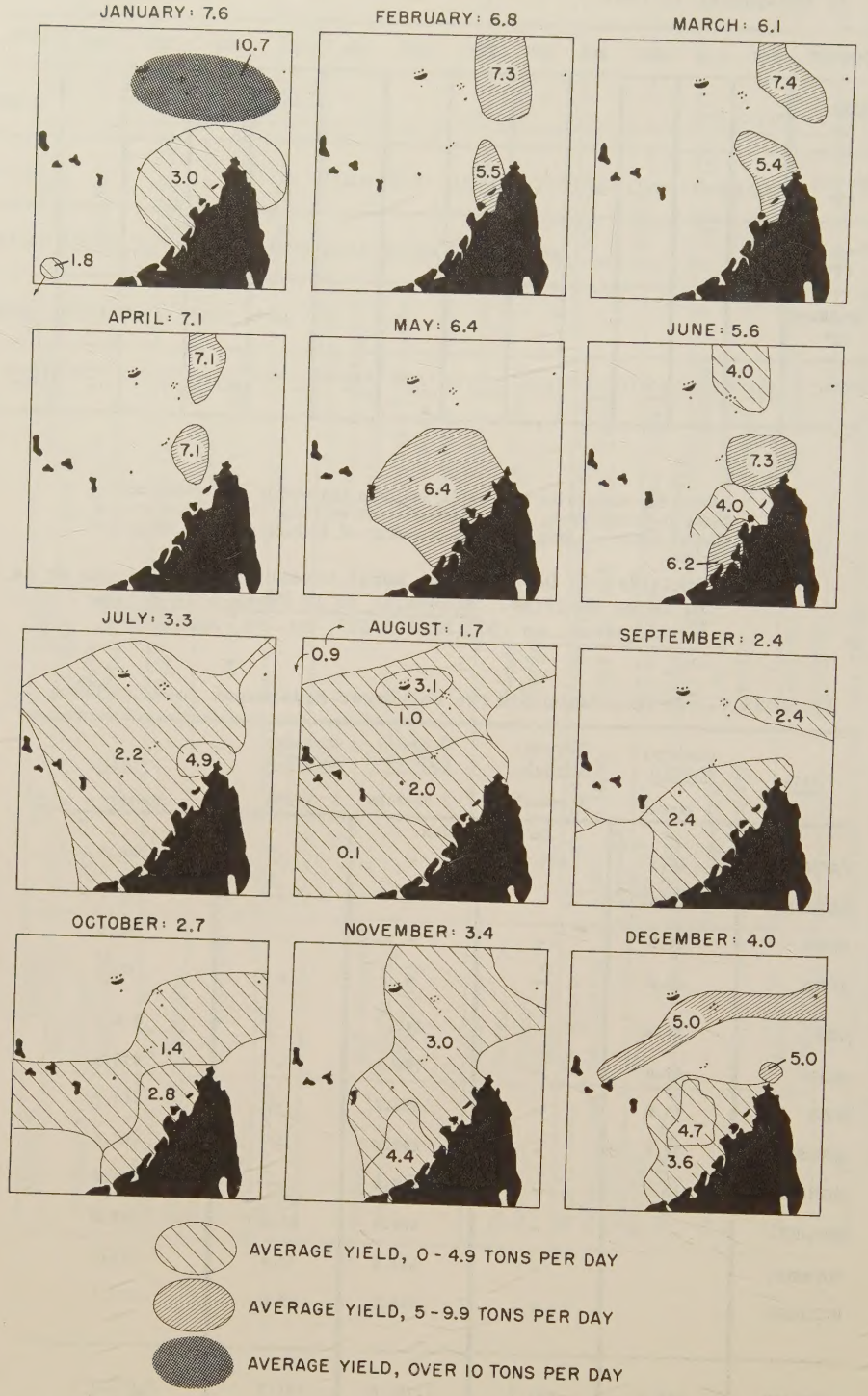
Source: Ministère du Developpment Rural. Direction de l'Elevage et de la Pêche Maritime. Resultats de la Pêche à la Bonite à Madagascar, en 1973, MAG/68/515, no. 14, April 1974.

Appendix C.--Bonito catch off the northwest Madagascar coast, 1973

1973	Company: TOSHOKU 1 vessel	Company: K.G.K.K. 3 vessels	Company: COMANIP 9 vessels	Company: MANIBICO 1 vessel	TOTAL monthly
		in metric tons			
JANUARY	46.5	487.7	-	-	534.2
FEBRUARY	67.2	-	-	-	167.9
MARCH	81.0	-	-	-	81,0
APRIL	80.6	-	-	-	80.6
MAY	71.0	-	247.7	-	318.7
JUNE	89.8	-	748.7	-	838.5
JULY	63.0	-	356.7	-	419.7
AUGUST	34.4	-	248.2	-	282.6
SEPTEMBER	15.5	-	459.3	-	474.8
OCTOBER		-	409.4	49.6	459.0
NOVEMBER		-	623.6	72.4	696.0
DECEMBER		-	688.1	69.0	757.1
Company Total	549.7	487.7	3,781.8	191.0	5,010.1 T GRAND TOTAL 1973

Source: Ministère du Developpment Rural. Direction de l'Elevage et de la Pêche Maritime. Resultats de la Pêche à la Bonite à Madagascar, en 1973, MAG/68/515, no. 14, April, 1974.

Appendix D.--Tuna yields of zones fished



Source: Ministère du Developpment Rural. Direction de l'Elevage de la Pêche Maritime. Resultats de la Pêche à la Bonite à Madagascar, en 1973, MAG/68/515, no. 14, April, 1974.

Appendix E.--Tuna companies operating from Madagascar, 1974

ACRONYM	COMANIP		MANVICO
Company's name	Compagnie Malgache et Nippone de Pêcherie	Toshoku Ltd.	Société Malgache Nippone de Viande Concentrée
Address and/or headquarters	LT 23, Lalana Rainibetsimisaraka Tananarive	Société Toshoku, Cité Planton Tananarive	
No. of vessels (in 1974)	9 vessels		
Catch (in 1974)	11,180 t		390 t
Employment	Japanese, Korean, and Malagasy crewmen		
Storage facilities		5,000-GRT freezer vessel can store 3,000 t of fish at -30°C	
Other information	Will construct cold storage plant, smoke house, ice-making facility, and brine freezing system.	Deals only in transshipping tuna and allied species from ROK and Taiwan longliners operating out of Tamatave.	Won government approval in 1973 to fish experimentally
Ownership	Malagasy/Japanese	Japanese	Malagasy/Japanese

Appendix F.--Commercial fishermen's salaries in Madagascar, effective March 1, 1976

	TYPE OF FISHING		
	Inner Coastal[1/]	Outer Coastal[2/]	Deep-Sea
	in U.S. dollars[3/]		
Permanent Employees (monthly salary)			
Unskilled sailor	35.85	42.48	57.36
Sailor/kitchen aid	39.42	46.73	58.41
Mess help	44.20	52.39	65.49
Skilled sailor	48.98	58.05	72.57
Storekeeper	51.38	60.89	76.11
Various professional jobs (carpenters, boilermen, etc.)	64.52	76.48	95.59
Chief cook	75.28	89.22	111.52
Refrigeration technicians and skilled workers	81.25	92.97	120.37
Bosun and chief mechanic	89.61	106.21	132.76
Chief mate	105.15	124.62	155.77
Captain	NA	NA	NA
Temporary Employees[4/] (hourly salary)	0.11	0.14	0.17

1/ Less than 30 miles from shore
2/ More than 30 miles from shore
3/ Converted at the exchange rate effective on March 22, 1976 (235 Malagasy francs=U.S.$1.00)
4/ Fringe benefits are prorated for temporary employees.

Source: Directorat de la Marine Marchande.

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